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Devoted to Product Finishing in the Factory

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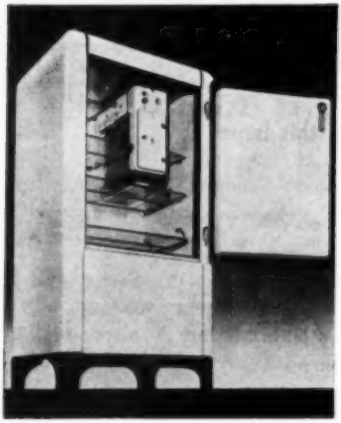

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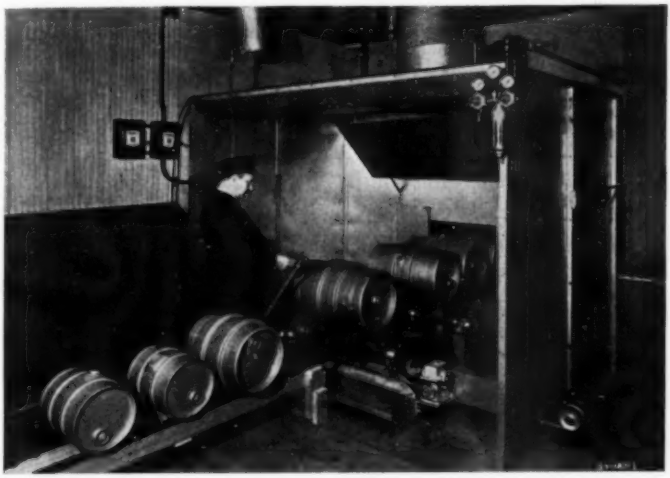


Finishing, Cleaning and Refinishing

Steel Drums

by Albert F. Byers
Benjamin Franklin Paint & Varnish Co.

PARTICULAR problems face those who finish and refinish steel drums—problems differing from the ones faced by finishers of other products. Drum coatings have certain requirements not usually expected of other finishes. They must identify either the contents of the drum, or the concern from which it comes, or both. The outside of the drum must stand up under the severest kind of treatment—rolling, bumping, rough handling and exposure to weather; the inside must withstand the action of whatever material is put into the drum.

In addition to these rather rigid requirements, drum enamels must also have eye appeal. Their function is not so much to protect (although they must withstand hard service) as it is to identify and advertise. Every drum that a company sends out, whether that company manufactures the drum or uses it as a container, is a traveling advertisement for the concern shipping it. As an advertisement, it should present a

pleasing, attractive appearance, and have a good gloss, suggestive of freshness and newness. For ready identification, it should have clean, bright, contrasting colors.

In some cases the drum is refinished every time it is reshipped; in other cases the color must be changed as the contents vary. And a drum, after all, is only a container, and not a display article, despite its very real potential advertising value. So the finishing cost, and even more particularly, the refinishing cost, must be kept reasonably low. The best way to lower these costs is not to employ the cheapest kind of coating, but rather to adopt the most economical finishing or refinishing procedure. The chief factors in such procedure would normally be speed of application and drying. However, as the finishing of new drums by their manufacturers, and the refinishing of old drums by their users, present two distinct problems, we will consider them separately.

Finishing New Drums

New drums are seldom finished by hand. One of two finishing methods—spraying, or rolling in a paint bath — is generally employed to advantage by drum manufacturers. In the first case, the drums are moved to the spray booth on a conveyor, or rolled along a runway. The conveyor or runway usually passes right through the booth and extends into the drying oven. Some firms use baking enamels and japans as drum coatings, but even where air drying finishes are employed, the oven is an advisable adjunct to shorten the finishing time. In the latter case, the finish is not baked, but merely force dried at a temperature much lower than that required for baking.

The second method of finishing drums is to roll them in a paint bath. A specially constructed tub of sufficient depth is filled with the finish desired, and the drums are conveyed to it — usually by gravity down a runway. Plunging into the tank, they are gripped by a clutch which rolls them through the paint and lifts them out. From the wet paint they are usually conveyed to a drying oven.

Refinishing Old Drums

Old drums are frequently refinished by hand brushing. The procedure worked out by one of our customers is simple enough, but requires a certain technique in brushing. At one end of the finishing platform the finisher receives cleaned drums that are ready to be recoated. At the other end of the platform he delivers the refinished drums for filling and shipping. The actual brushing is done in transit between the two ends of the platform.

The finisher grasps the empty uncoated drum, tilts it and, with one hand, rolls it down the platform; as the drum rotates he applies enamel with a wide brush, as shown in Fig. 2. He starts at the top, and by the time the drum has traversed the platform, his brush hand has reached the bottom. The whole drum, with the exception of its two ends, is thus painted in no longer time than is required to roll it from one end of the platform to the other. As the drums would have to be rolled or otherwise conveyed from the cleaning tank to the filling station anyway, practically no extra time is devoted to the actual application of paint—that is, with the

exception of painting the drum heads, which is a matter of only a moment's brushing.

Identification of Drums

Identification by color is a particularly important factor in shipping filled drums. This is especially true of drums that are shipped abroad. In this connection, you may be interested to know why the finishing department of a certain concern was warned to be careful that the coatings on their drums did not vary in the slightest from the exact colors specified. This warning was based upon the obvious fact that foreign labor (in this case Chinese coolies) could not read English, and could therefore identify the contents of various drums only by the colors of the drums. In the handling of many drums containing varying products, these coolies had come to associate certain products with certain shades of color. If, therefore, the exact color of the drum were not kept a constant factor, confusion would reign in the factories or warehouses of the foreign importer.

Cleaning Old Drums

Naturally, before drums are refinished they must be thoroughly cleaned. Not only should all the old paint be removed from the outside, but the inside of the drum must be thoroughly cleaned of whatever material it previously contained. Many firms recoat their drums without first cleaning off the old paint, but this procedure can scarcely be recommended, especially since the old paint can be cleaned off while the inside of the drum is being scoured. The one operation can be made to do both jobs, particularly if the material contained in the drum is readily attacked by strong alkalies. For this double purpose a tank should be filled with hot water to which caustic soda, or other strong cleaning agent, has been added. The drums are conveyed to this tank, plunged in, and washed, both inside and outside. When they are withdrawn, they should be free from old outside paint and also from whatever material they previously contained. They are then rinsed with hot water, to remove all traces of the cleaning solution.

Refinishing drums by hand rolling and brushing while they are being transferred from one place to another.

Drums containing materials which are not attacked by strong alkalies can be cleaned inside by various mechanical devices now on the market. Or they can be hand cleaned by pouring in shot or chains along with a suitable cleaning solution, and then rolling or agitating the drum. This process, like that mentioned above,

(Continued on page 26)

Fig. 1—Illustrating air flow from five jets in spray gun. Only the center stream contains paint or lacquer.

Economical Finishing

by Carl W. Sanders
Engineer, Binks Mfg. Co.

■ ■ ■ ■

PAINT covering capacity, high or low air pressure, internal or external atomization, paint viscosity, and air consumption, are all subjects which have been thoroughly discussed separately, but to fit the various factors according to individual needs, their inter-relations should be studied.

The first thought of the production manager usually is quality at high speed. Fifteen or twenty years ago, anything faster than a brush meant speed. Now it has become a matter of spray nozzle speed, with the quality a foregone and expected conclusion.

In the development of spray nozzles for improving the texture of the finish coat, as well as for increasing the speed of its application, constantly improved methods have been forthcoming.

Many improvements were made without increasing consumption of air, but the constantly increasing demand for more speed forced the gun manufacturers to resort to methods employing the use of greater energy. In consequence the old 7 to 8-c.f.m.* guns of earlier days have given way to the present day production type set-ups using well over 15-c.f.m. and as high as 25-c.f.m.

In the use of this additional energy, naturally there must be expected a greater material handling capacity. By capacity I refer to the actual efficiency of the gun nozzle. For example, at 90-lbs. air pressure, a certain set-up using 10-c.f.m. will atomize a fixed rate of fluid flow resulting in a uniformly distributed, well-atomized coating.

Assuming that this particular set-up, as above used, produced its best results at 10-lbs. fluid pressure, any increase of fluid pressure above 10-lbs. would mean

* C.F.M. is cubic feet per minute.

Fig. 2—Spraying synthetic enamels with 85 pounds pressure and 17 cubic feet per minute displacement.

ingwith Compressed Air

the destruction of the scientific balance between fluid and air pressure. The saturation point of any spray nozzle is that point where the air resistance, or energy, begins to break down under an excessive fluid pressure.

The efficiency of a spray gun does not increase proportionately with the increase in air volume or pressure.

Experience has shown that air velocity, rather than air volume, is the controlling factor in nozzle efficiency. Air volume increases are largely the result of the necessity for increasing the diameter of side ports in order to balance or surround center ports, which in turn had been opened up to care for increase paint volume.

In the older type nozzles, side ports or "ears," as they are commonly called, were spread further apart so that the blast of air was expanded sufficiently so as not to penetrate or "split" the center port.

The nozzle shown in Fig. 1 was

Many factors enter into a discussion on this subject, but compressed air, and its intelligent use, will in itself lend sufficient importance for isolated consideration.

■ ■ ■ ■

the first practical improvement over the old method, wherein you will note the addition of two small jets running parallel to the center jet. This feature increases the resistance to side port jets without increasing the center port diameter.

It served the very valuable purpose of permitting greater energy from the side without increasing air port openings, by simply changing the side port angle so that the air streams were aimed more directly at the center. In older type set-ups the side ports were drilled so that the air had more of a tendency to ride with the center stream, whereas

newer developments have permitted as much as 13° closer angles and almost a direct attack.

This type of 5-hole air nozzle led the way for a new race in greater nozzle efficiency and now we have a 7-hole and even a 9-hole air nozzle.

Each feature has had its good points. With each new development, came more speed.

But with the new development came increased air volume, and here is the situation or condition where some caution should be exercised.

With each increase of air consumption, there is the possibility of increased atomizing efficiency, provided there is intelligent use of the additional energy. But there are limits to atomization requirements if further inprovements are to increase the final cost of the product beyond the value allowed for the increased quality at high speed.

Air, 9c per M-cu.ft.

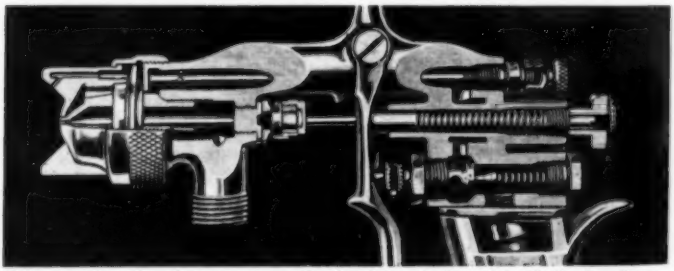
First of all, a gun stepped up from 17-c.f.m. to 25-c.f.m. insures an increase of 8-c.f.m. Assuming a plant uses an average of 25 guns pulling steady, and operates 250 8-hour days, a total of 24,000,000-cu.ft. of air will have been consumed to secure the increased speed. At 9c per 1,000-cu.ft., which is a fair average cost for air produced in this volume, a total of $2160 will have been spent for power, depreciation and maintenance costs.

Some big plants produce air for as low as 4c, but many smaller plants, if they figure correctly, find their air cost higher than that used in my figures. Now, if we admit that the cost of air is more than offset by improvement in surface texture, then study the following line of thought and experience:

If a satisfactory, high-class finish can be obtained at high speed with 17-c.f.m., then a gun using 25-c.f.m. will cost more to operate for the following reason:

Too Much Air Is Wasteful

Eight additional cubic feet of air, released at 90-lbs. pressure, will carry a corresponding increase in spray mist volume. With the increase in mist goes your increase in paint loss up the exhaust stack. No argument can overcome the greater loss of paint due to increased air volume. Up to a certain extent the increase in quality and speed overcame the increase in paint loss, but



Cut away view of modern spray gun showing internal view of nozzle head and gun.

further advance along the auxiliary-jet-increase theory is like shooting a sparrow with 10-gauge shot gun.

The internal mixture gun has had its share of experimental attention. But the wide range of variables force "day-in-and-day-out" production plants to confine their requirements to practical, serviceable and interchangeable types.

The results of a practical test, conducted with the use of scientifically correct fluid measuring devices and film depth gauges, all used on actual production, prove beyond a shadow of doubt that there is a limit to the sensible use of air.

The increase of 8-c.f.m. per nozzle resulted in an increase of 4% of mixed paint consumed and a decrease of 12% in the depth of the finish coat applied. To produce the same number of finished pieces with a coating equal to the nozzle consuming 17-cu.ft., the 25-cu.ft. nozzle would require 16% more paint.

The texture of a finish coat produced with a well designed 17-cu.ft. nozzle, will, with ordinary care and under reasonable conditions, produce a beautiful surface well within the range of a most critical inspector.

A modern spray gun and its shadow, showing micrometer controls over air and material.

Lacquered Labels

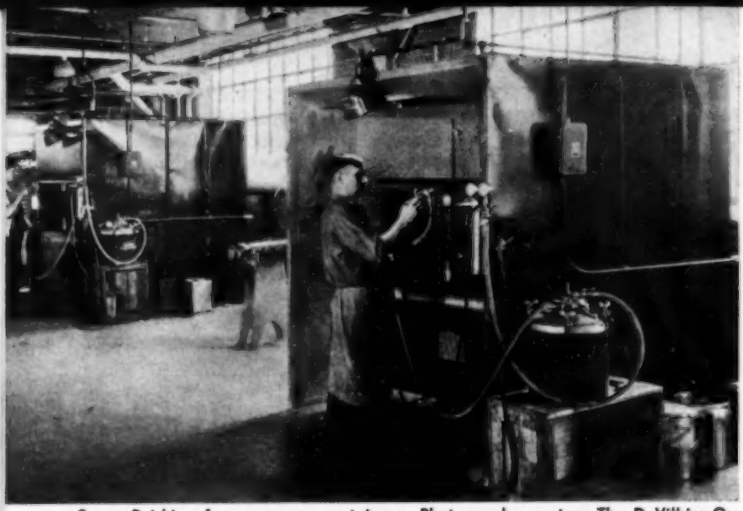
Nitrocellulose lacquer has been used for coating labels with very good results. It adds to the gloss of the label and brings out lettering or pictures much more clearly than an unlacquered label. However, it is necessary to choose a lacquer of the proper composition with respect to solvents and other ingredients, so that the inks in the label do not bleed through. In addition to improving the appearance of the labels, they are rendered waterproof.—D. R.

Hilo Announces Appointment

Hilo Varnish Corporation announces the appointment as Sales Representative in Western New York and Eastern Ohio of Alfred R. Calo, who for some years has been connected with the Technical Staff at their headquarters in Brooklyn.

Furniture Shows Open Earlier

The American Furniture Mart has advanced the opening of the fall market at the Mart from Nov. 4 to the previous Wednesday, Oct. 30. Under the revised schedule, the market will open Wednesday, Oct. 30, and close Tuesday night, Nov. 5. As the eastern market at Jamestown, N. Y., opens on Oct. 28, eastern buyers will be able to spend two days at Jamestown before continuing west to Chicago. The Grand Rapids market will also open on Oct. 30.



Spray finishing from pressure containers. Photograph, courtesy The DeVilbiss Co.

Line Production Applied to Furniture Finishing

by Herman Erickson

Editor's Note: The author of this article, formerly foreman of finishing in a large southern furniture factory, is now acting as service man for a manufacturer of wood finishing materials.

WHILE the various other departments in furniture factories have attained a high degree of efficiency by the introduction of the latest machinery and other mechanical equipment, the finishing room has been somewhat neglected in this respect. After the universal adoption of spray guns and the rubbing machines, little has been done by the manufacturers themselves to keep in step with the progress made by manufacturers in other industries, who use finishing materials.

Makers of finishing materials maintain costly laboratories in order to improve their products and develop new ones. Notable among these are the synthetic varnishes, non-grain-raising stains, and quick-drying fillers and sealers. Some of these have been designed for use in plants where production methods are more exact than

The Bunting Glider plant in Philadelphia is one of the finest metal furniture plants in America. Metal working, fabric cutting, pillow making, tube bending, spring assembly and finishing of porch gliders, chairs, tables and bed springs are all done under one roof. Operating costs must be low. Quality must be high.

To fit finishing into such a schedule Sherwin-Williams Finishing Engineers aid Bunting Glider with all finishing problems . . . cleaning, dipping, spraying, drying.

Bunting Glider demands the best in method and materials. To get the best, they use Sherwin-Williams paint engineering and finishes.

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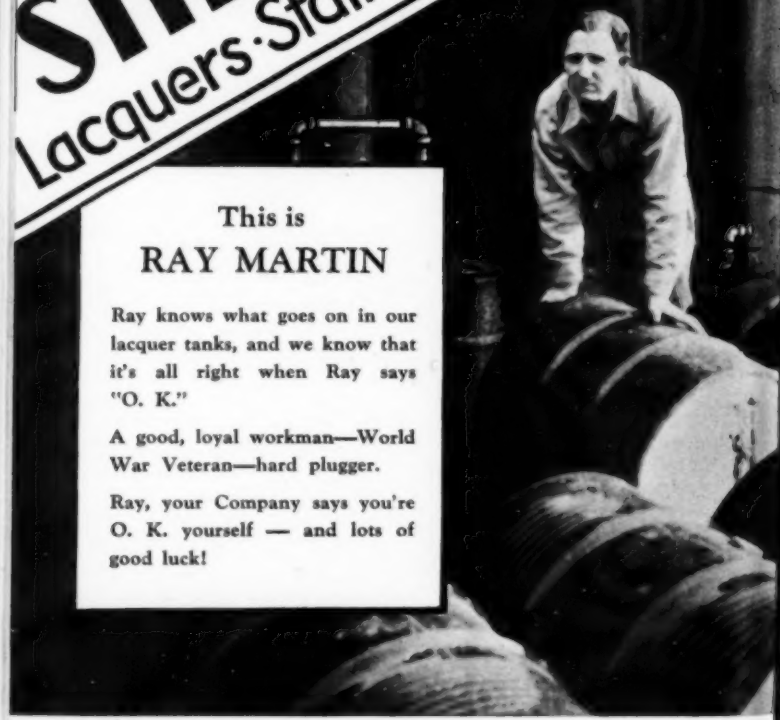

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Ray, your Company says you're O. K. yourself — and lots of good luck!

THE STILLE-YOUNG CORPORATIO

Manufacturers

CHICAGO, ILL. HIGH POINT, N.C

one finds in the average furniture factory. Samples of these products are sent to the furniture plants and are often tried out under adverse conditions, and by men who know little about the properties and use of the material in question.

This is not an indictment against the capability of the foreman finisher. His nose is kept to the grindstone every hour of the day trying to keep up with the increasing pace of production, with what means he has at his disposal. Very often this "keeping up" is done at the expense of the quality of the finish, which fact has been pointed out previously in this publication. Consequently the finisher has very little time to make a thorough test of a new material and adapt it to the conditions in his shop.

Drying of the various finishing coats is a most important phase of high speed production methods, and should by all means be done under controlled conditions. Yet in many plants this is left to the vagaries of King Sol and Jupiter Pluvius, or whatever deities it is that govern the weather. A filler, for example, that is designed to dry in four hours under controlled drying, would probably not be dry the next day under adverse circumstances. But the work must go on regardless; and, of course, the result is a poorly finished piece of furniture.

Conveyor Line Finishing

Finishing on a conveyer line has been practiced for some time in the automobile industry, on radio cabinets, and on many other products. The finishing of furniture in this manner presents many problems to be solved due

Radio cabinets "on the line" in modern finishing department at the plant of Philco Radio & Television Corp., Philadelphia. Photograph, courtesy Sherwin-Williams Co.

to the variations in size, shape and kinds of wood used. Add thereto the more or less fancied demand for bizarre effects in furniture finishes and the lack of standardization of finishing methods, and one can readily under-

A section of the "rubbing line" in the finishing department of B. P. John Furniture Corp., Portland, Ore. Photograph, courtesy the Sherwin-Williams Co.

stand the hesitation of the furniture maker toward installing expensive equipment.

However, some chair factories are now installing conveyors and one or two within the writer's knowledge already have them in operation. Their application to case goods manufacture can probably be accomplished by standardizing finishing methods, carefully analyzing the various operations, and selecting proper materials. The cost of handling the product, which in some plants runs as high as 40% of the total finishing labor, would be reduced to a minimum, and this saving alone should make the installation pay for itself in a short time. There would also be a tendency towards better control of uniformity of the finish and of costs.

Let us picture in our minds a plant making a medium priced line of bedroom furniture. The conveyor line could start in the assembling room after the cases are clamped together. The fitting of drawers, doors and tops, and the application of mouldings and ornaments would be broken up into its component parts so that each operation could be performed within the time limit set by the speed of the conveyor.

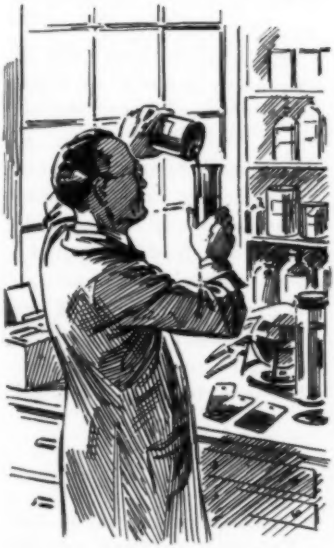
From the assembling room, the cases now pass on into the finishing room. The first operation here is the uniforming of sap and light woods. This is done with a non-grain-raising stain; no drying time is required after this operation. Next comes the application by spray, over all, with a stain of the same type. After ten minutes drying at a temperature of 110° F. the cases are ready to be filled.

Dispense With Wash Coat

The writer has found, after exhaustive tests, that washcoating with shellac on the stain can be dispensed with. Indeed better results, in the way of clearness of color and elimination of pinholes in the filler, are obtained without the shellac coat. It is, of course, important to use a filler of the correct color, as the wood will absorb a little more of the color when it is not shellaced. The operator should not be allowed to mix the filler by guess, or to reduce it after it once has been mixed to proper consistency. Too much naphtha or other thinner will cause a separation of the colors and pigments from the suspending oils, and thus make the

(Continued on page 26)

A TRIUMPHANT *Finish* FOR INDUSTRIAL FINISHING PROBLEMS



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When you are next in the market for lacquer products, send for the Egyptian man. There is one near you. He will be glad to tell you about all standard Egyptian Lacquers and what can be done with a test tube if your requirements are that kind.

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Wood Golf Club Heads

(Lacquer Finishing)

by R. J. Fairburn
Zapon-Brevolite Lacquer Co.

A proper finish for wooden golf club heads presents an unusual problem the solution of which will be of interest not only to golf club manufacturers but to firms that make and finish other parts or articles made of wood. The process described here is used by several golf club companies. It will probably be improved upon in the future, but today it seems to give the most satisfactory finish with materials now available.

WOOD HEADS for golf clubs are made of persimmon, which has very large pores, but is quite hard and not at all spongy. This wood has no particular beauty; therefore the manufacturer stains it to give it a pleasing color. A paste wood filler is used to fill the pores.

Following the stain and filler, several coats of varnish were formerly applied to give a protective and lustrous finish. While there were varnishes that were tough and suitable for outdoor service, they were slow in drying. As the game of golf became more popular, a quicker production schedule was necessary to meet the increased demand for clubs.

Wood lacquers were being pioneered at about that time and many manufacturers adopted them in place of varnish. Lacquer's popularity was short lived however. Too many clubs were returned for refinishing because of chipping. There had always been a certain amount of this trouble with varnish, but it seemed to be increased with the harder lacquer finish. Some manufacturers went back to varnish, in some cases installing drying equipment to shorten their finishing schedules. This was expensive and not altogether satisfactory. For one thing lacquer is a richer, harder finish and does not pick up so much dirt when first sprayed.

Naturally, lacquer manufacturers were busily trying to improve their products. More flexible lacquers were brought out and this was a long stride forward. Solid content was increased and this more nearly matched the depth of finish produced with varnish. Lacquers were made to buff and polish with greater ease and, all in all, they seemed to have some merit over varnish. So fine was the line of discrimination between varnish and lacquer, however, that both had their cham-

pions, some manufacturers using one and some using the other. Many shops used varnish on stock orders and lacquer on rush work only.

With all this work in developing a proper club finish, chipping was still a serious fault. Whether the finish was lacquer or varnish, far too many clubs were coming back for refinishing. Experimenting showed that this was partly overcome by eliminating sealer or shellac as a first coat under the lacquer or varnish. This coat was replaced by a thinner coat of lacquer or varnish, which was then followed by one or more heavier coats.

Further study showed that moist air was being bottled up in the pores of the wood. Some of this moisture came from the water stain used, and some of it from slow-drying filler that was not permitted to become "bone" dry before the first finishing coat was applied. There was, of course, some moist air in the pores before the staining operation. The first time the clubs were exposed to hot sunshine this moisture expanded and caused blisters to form, loosening the varnish or lacquer. When the club was used, the finish chipped at these points.

To overcome these several faults the following schedule and materials are now used:

1. STAINING—A quick-drying stain of the non-grain-raising type is used. This stain combines some of the good features of both oil and water stain. It has uniform penetration; gives uniform color; air dries to sand in about one hour. The more popular colors for clubs are walnut, mahogany, and black.

2. SANDING—Since this wood is not fuzzy, a great amount of sanding is not necessary. Most shops use a fine steel wool and cuff the heads lightly.

3. SEALING—This operation is most important. On it hinges much of the success of the finish. A synthetic-resin-base sealer is thinned to water-like consistency with a special thinner, the main ingredient of which is toluol. The clubs are immersed in this sealer which lines the pores and drives out the moisture, which can not again enter.

If the clubs are heated before being sealed, this operation is more thorough and requires only 20 or 30 seconds immersion. So rapidly will the air be forced out that the surface of the sealer will bubble much like boiling water. If the clubs are not heated, they should be immersed two or three minutes. This sealer should air dry 10 or 15 minutes. If the clubs are not to be filled immediately, it is well to wipe off the excess sealer. Otherwise, this is accomplished in the filling operation. It is not intended that the sealer should lay on the surface and form a film; its sole purpose is to make the wood moisture proof.

4. FILLING—A quick-drying paste wood filler is used. To hasten its drying and also give it more of an affinity with the sealer, the filler is thinned with the same thinner that is used in the sealer. The filler is worked into the wood very carefully; in some shops this is done with the bare hands. Excess filler is then carefully wiped off to avoid cloudiness. The filler should be "bone" dry before lacquer is applied. Two

or three hours are usually sufficient with this particular filler.

5. MASKING—Most wood club heads have steel shoe plates and decorative inlays of some kind. Where possible, these should be masked before staining and filling. In some cases they are not masked but are cleaned off later with steel wool or with a buffing wheel.

6. FIRST LACQUER COAT—The preceding operations are usually accomplished in one day and the first coat of lacquer is sprayed on the same day. This coat air dries overnight. A heavy first coat of lacquer should be avoided. The average club lacquer should be reduced, at least a third with lacquer thinner, for this coat. Heavy coats invite chipping. This is particularly true on the metal shoe plate. Enough coats are used that a proper depth of finish will be had by the time the clubs are buffed. The first coat should be used as a bond coat between the wood and the heavier lacquer coat to follow.

7. SECOND LACQUER COAT—A second coat of the same lacquer is sprayed the morning of the second day. The lacquer should not be reduced more than is necessary for smooth flowing. This is a building coat.

8. THIRD LACQUER COAT—The third coat is sprayed on during the afternoon of the second day. It air dries over night. For most work, this is the final lacquer coat. If more coats are desired, it is not good practice to apply more than two coats a day.

9. BUFFING — The third day, the clubs may be buffed on a motor-driven buffing wheel. This operation is exacting and should be performed by an experienced operator. Too little pressure will not properly smooth the lacquer, and too much pressure may burn the lacquer. This operation flows the surface of the lacquer together and gives it a density and apparent depth that is not duplicated in any other manner. Buffing wheel speed should approximate 1400-r.p.m. A greater speed will almost invariably burn the lacquer. This is one of the most frequent causes of failure in lacquer buffing. A grease-free stick compound should be used to dress the wheel. A 10-in., stitched cotton wheel is best. The club is then polished on a loose cotton buff, usually on the same spindle.

10. STAMPING—Most clubs have the trade name and sometimes the dealer's name cut into the wood with a hand steel stamp. With some lacquers it is necessary to do this before the lacquer is applied. Some shops put the finished clubs in stock unstamped and then stamp them on order. In this case they may be in stock 60 or 90 days before being stamped. The lacquer must be flexible enough to take this stamping operation without chipping. The stamping is as much as 1/16-in. deep, with sharply cut edges. This stamping is then filled in with quick-drying enamel, and the excess wiped off.

11. WRAPPING — Following buffing, the clubs are usually protected with soft flannel bags and the entire club is then wrapped in cellophane or some similar protective sheath.

The synthetic resin sealer, used in this schedule, can be used with equal satisfaction on toilet seats and for other wood finishing.

Aircraft Insignia—IV

On Commercial and U. S. Military Airplanes

by George A. Endom

ON EACH SIDE of the fuselage or hull, midway between the longerons and parallel to the longitudinal axis of the airplane, the branch of the service (U.S. Navy or U.S. Marine) is painted in appropriate size lettering, with the last letter approximately 12-in. forward of the rudder hinge. The lettering is of the modified block type and must never be less than 4-in. in height.

On Marine Corps aircraft a transfer of the Corps Insignia is furnished to the contractor, and is applied in same manner as any oil-paint, paper-backed transfer.

The location and the size of the star insignia differ from Army Air Corps insignia by: a) the center is located in from the wing tip a distance equal to the chord length of the wing; and, b) the size of the circumscribed circle is determined by being the same as the distance between the leading edge of the aileron and the leading edge of the wing. The diameter of the circumscribed circle must never exceed 60-in. Position of the star remains the same—one point directly forward, and the edge of the outer circle tangent with the aileron cut-out. (See illustration on page 24, August issue.)

Before proceeding with the final information regarding rudder and fin marking, it might be advisable to note that there is considerable detail in regard to the marking and insignia application on lighter-than air aircraft.

This is the final article in a series of four. This one begins with Fuselage Marking and Star Insignia on U. S. Navy, Marine and Coast Guard Aircraft. Previous articles appeared in July, August and September issues.

Because it is only in rare instances, if ever, that this information will be needed, and as it can be readily obtained when necessary, this will be omitted. Also, all squadron identification, and colors (which are usually applied in service) are omitted.

Rudder and Vertical Stabilizer

Only occasionally, on certain types, are the colors red, white and blue used on Navy airplanes. When this insignia is used, the rudder is divided into three equal sections for three vertical stripes: blue, in the front, at and around the hinge post; white in the center, and red at the rear. The balance section of the rudder is fin-

ished in the same color as the vertical stabilizer (or fin).

Regardless of whether the rudder receives the red, white and blue insignia or is finished in the standard color, the name of the manufacturer, model and class are designated in letters and numbers 3-in. high, centrally near the top, on both sides. The serial number

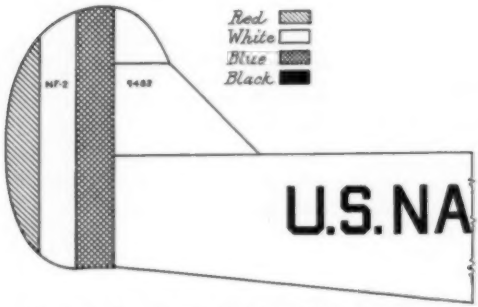


Fig. 1—Rudder, fin and fuselage markings on U. S. Navy planes. Three vertical stripes on rudder, from left or rear end are red, white and blue; Model identification printed in white stripe. Serial number appears on fin below rudder balance.

of the airplane (as specified and assigned by the Navy Department) is painted in the same size, and in line with the rudder lettering, on both sides of the fin, see Fig. 1.

The specification covering the foregoing, calls for the use of "lacquer" as the material to be used in the application of lettering and insignia; but, as "lacquer" is presumed to mean a pyroxylin-base product, nitrate dope is generally acceptable as the material for the star insignia on nitrate doped fabric. Colors are named for contrast in lettering: for example—white on red or blue; and black on white, aluminum, green, or yellow.

Size of lettering is designated: "the width of the letters shall be approximately three-quarters of the height, and the stroke shall be at least 1-16 of the height."

All hand-grips and walk-ways are marked by being painted black.

Coast-Guard Marking and Insignia

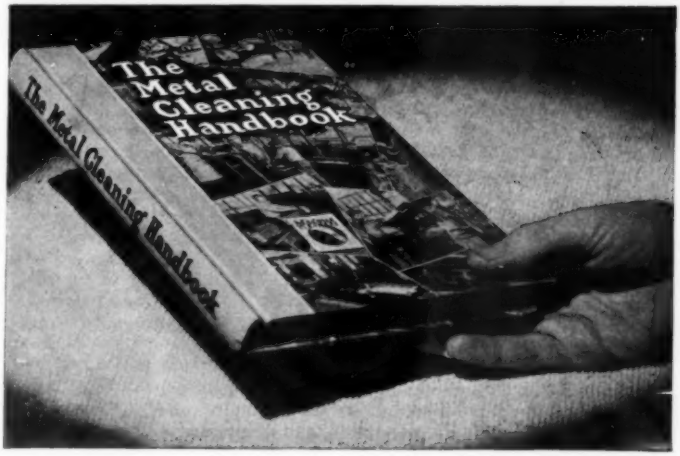
The U.S. Coast Guard airplane marking and star insignia are practically the same as those for the U.S. Navy, except:

On the bottom sides of the lower wings, in 24-in. letters, the initials, "U.S." on the right wing, and "C.G." on the left wing, are applied in approximately the same position as the lettering "U.S. ARMY" to Air Corps airplanes.

The rudder insignia is also different. One-third of the entire area to the rear of the hinge post is blue. This blue field is at the top of the rudder. The remaining two-thirds below the blue is divided into five equal vertical stripes; three red and two white, alternating. Serial number, model, and manufacturer's identification remain the same as on standard Navy airplanes. (See Fig. 2.)

Summary

All of the matter contained in the foregoing has been written with the purpose in mind of furnishing the reader with a fairly comprehensive ready-reference of the three major types of military aircraft marking and insignia. It should be of considerable aid in



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settling those annoying little doubts which arise in the foreman finisher's mind from time to time as to whether one size and/or location belong to one branch of the service or vice versa. It should eliminate the necessity of delving through a mass of specifications (usually at a time when one is most busy) to prove to the satisfaction of oneself and the Inspector, that the technical detail is correct.

Of course, as new materials and different types of aircraft are developed the specifications given at the beginning of this article will be revised, consequently the one responsible for the correct application of the various items given herein should keep up to date. This is a fact every finisher realizes by having to familiarize himself with the constant change and development of finishing processes and materials.

However, to my knowledge there have been very few changes in the insignia and marking of Military aircraft in the past 15 years. To mention a few of the more important: Rudder striping has been altered to give each service (Army, Navy and Coast Guard) a special designation; materials have changed from oil-base enamels to pyroxylin coaters; the use

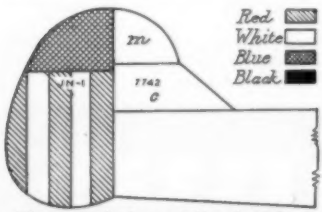


Fig. 2—Insignia on tail end of U. S. Coast Guard aircraft. The rudder balance marked "m" is painted in aluminum color. On fin "c" serial number is printed.

of transfers in applying the star insignia has been prohibited, and some additions have been added to lettering.

In conclusion, those items which have not changed and are of first importance to remember are:

1. Be sure all lettering faces correctly, that is, the tops of the letters always to the leading edge; one point of the star always pointing forward or, on vertical surfaces, up.

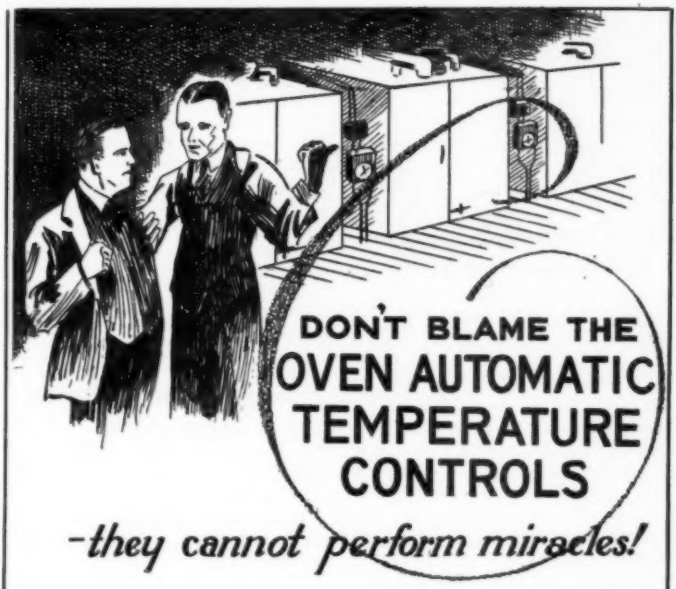
2. The inner red circle should never touch the inner points of the star, but always be tangent with the sides of the pentagon formed by those points.

3. Remember the color markings of pipe lines. Disastrous results can attend the wrong identification of these lines.

4. Army Air Corps marking and code locations are easy to remember: Theoretically, all important marking and codes can be read with ease from the pilot's cockpit; the Navy specification is not so detailed.

5. Nitrate dope and lacquer insignia colors are usually less flexible than standard pigmented dopes, so it is well to avoid applying more than is necessary to give a solid-color finish.

6. On any fabric section that has mistakenly received insignia red nitrate dope or lacquer over a large area, it is, in most cases, quicker and safer to recover that section than to try to seal it. Where only a small drop or slight over-spray or brush mark shows, a good way to remove the red is to let it dry, then carefully scrape with a knife or razor-blade; coat with aluminum and, when dry, apply the color needed. Try to avoid using shellac or commercial sealers over doped fabric, as in



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most cases these are either too brittle or they have poor adhesion.

After a little practice, following this information carefully, the finisher will find it a simple matter to apply any of the required details with ease and neatness of workmanship.

Line Production Applied to Furniture Finishing

(Continued from page 16)

results of the filling unsatisfactory.

Suggested Finish Schedule

The filling is broken up into four operations: 1) application of filler, the setting of which can be hastened by blasts of air from fans; 2) the "rubbing in"; 3) the wiping off; and, finally, 4) the picking and brushing out of corners and crevices. Quick-drying fillers are now on the market, requiring from one to four hours forced drying.

After drying is completed the cases are passed on to a spray booth where any necessary touching up is done with a lacquer-type stain. The work is then passed on immediately to the sealer spray. The sealer requires 50 minutes of drying time, of which the first 30 minutes should be forced drying. The last 20 minutes of air drying is for the purpose of cooling off the cases before the sanding and final coating. As the work has been kept clean and smooth, only a light sanding with No. 6/0 paper is necessary, after which the work goes to the spray where it receives its final coat of either varnish or lacquer.

As can be seen from this schedule the whole finishing process, from the clamp to the final coat, is accomplished in less time than an ordinary working day. With the finishing room a series of spray booths and drying ovens, with controlled temperature and moisture; and the work moving mechanically, the foreman finisher would be relieved of the work and worry of "keeping the stuff moving." He could devote his time to checking the quality of the work put out by his men, and to checking the quality of the material used.

Finishing and Cleaning Steel Drums

(Continued from page 7)

should be followed by a thorough rinsing in hot water.

It is quite essential that hot water be used for rinsing, for two reasons:

1) Hot water dries (evaporates) much more rapidly than cold, therefore less time elapses between the cleaning and the refinishing of the drums.

2) Hot water evaporates so quickly that it does not rust the bare metal to which it is applied.

Thus cleaned, the drums are ready for refinishing in accordance with one of the methods described in this article. Methods used to finish new drums can also be applied to finish old drums. Which method is best for any individual concern naturally depends upon factors known only to that concern. But it should be stressed, in closing, that a drum is a traveling advertisement, as well as an important container, therefore it is a rather short-sighted policy that permits "any cheap finish" to be used.

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Rockford Varnish Co.

ROCKFORD, ILLINOIS

Finishing Steel Bodies for Commercial Cars

by Kam N. Kathju
Consulting Chemist, The Arco Co.

Metal Cleaning .....Rinsing
Primer-Surfacer .....Sanding
Lacquer.....or Synthetic Enamel

A CONCERN about to tool up its finishing department for handling several hundred all-steel commercial bodies a week has asked for information about the most economical methods, materials, and equipment to employ. It's a big order to attempt to deal with such a problem in a few words. However, at the Editor's request, I am submitting a few suggestions and recommendations based upon my experience and observation in the automotive field.

If a lasting finish is desired, the best plan is to begin by cleaning the body surfaces thoroughly with a satisfactory commercial cleaner (names on request). Then wash off the cleaner, first with cold water and then with hot water, but never vice versa. After this cleaning the body should be dried, preferably through a short oven, to remove all traces of water.

Begin finishing by spraying a combination primer-surfacer, either an oil-type or synthetic. If an oil-type primer-surfacer is used, it should be baked about one hour at 250°F.; if it is a synthetic, bake it 30 minutes at the same temperature. If the condition of the metal is bad, it is suggested that two double coats be used, allowing about ten minutes of air drying between coats. If two double coats are used, do not bake less than one hour at 250°F., whether the material is oil type, synthetic, or semi-synthetic.

After baking, the surface should be sanded with No. 360 wet-or-dry sandpaper, using plenty of water. In order to avoid the possibility of sandpaper scratches showing through the succeeding finish coat, if it is a synthetic type finish, I suggest that after sanding with No. 360 sandpaper, the surface be "slicked off" with discarded No. 360 sandpaper; that is, take paper that has already been used for sanding purposes—paper that has lost most of its cutting surface.

After this operation the body may be dried, preferably through a short oven, the finish repaired if necessary, and then tack-ragged. It may be finished thereafter in the usual way, by using two or three coats of lacquer or, if synthetic enamel is desired, two coats of synthetic enamel

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THE customer liked the chair. Oh, yes, she was perfectly satisfied, *except on one point.*

She looked at it more closely. Turned it over. There on the bottom of the seat was the answer to her unasked question. The sale was closed.

What did she see? Just a label—"Finished with Du Pont DUCO." But those words meant a lot to her. And if they had not been on that chair, they might easily have lost a sale for that dealer.

There are still some manufacturers who are saying—"But people do not pay that much attention to a finish." These manufacturers are constantly in danger of losing sales. Others say, "DUCO has proved that it helps to sell our furniture." And *they* are selling to thousands of people who know that the lasting beauty of DUCO gives furniture an extra value that is worth even a higher price. *There is sales power in the word "DUCO."*

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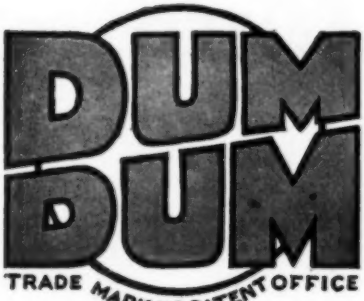

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baked 1½ hours at 250 to 275°F. This bake is longer and at a higher temperature than what is used on certain well known automobiles, but I believe it will give a better job, with less orange peel . . . .

Knowledge of the correct viscosities and gravities of synthetic enamels before spraying, to get the best job, is a science in itself, and I would be prone to believe that even some manufacturers of these enamels do not have satisfactory answers in regard to the correct gravities and viscosities at which these enamels should be baked.

On the insides of the trucks, whether of wood or metal, an oil-type, gray lead primer should be used. This will take almost any type of lacquer or synthetic enamel finish. This primer will air dry satisfactorily overnight or, while the primer surfacer is being baked it will automatically get baked at that temperature.

Finishing Disc Wheels

As to the finishing of disc wheels, by all means use a good grade of oil primer. If part of the production is to go in black, I suggest the color of the wheel primer be black; otherwise, a dark chocolate color.

Dipping is the most satisfactory means of applying the finish, considering the amount of production involved. Wheels will have to be hung a certain way so that the flow-off will be from the inner edge of the rim rather than from the outside. It is neither necessary nor important to sand this primer coat, because after it has been baked at about 300°F. for 40 to 60 minutes, it will flow out perfectly (unless there is some dirt flying around in the room); afterward, the wheels can be merely scuffed off lightly.

The wheels may likewise be finished in synthetic enamel on small jigs where the wheels are rotated as they are being sprayed, with a view to getting an even coat of material. Two coats are preferred, allowing about ten minutes between coats—either on the conveyor or on big racks where 40 to 50 wheels may be stacked at one time after spraying the first coat. They will be brought back to the spray booth for the second coat, which will give them about ten minutes drying between coats. The baking time on the wheels should run from 45 minutes to an hour at 250°F.

These specifications are very general to fit practically any manufacturer's materials. However, materials can be furnished which will bake satisfactorily on the bodies and wheels in 30 to 40 minutes, at about 200°F. . . . which will be infinitely cheaper, but not the most durable. The type of material best suited for outside exposure and maximum durability, hardness, non-chalking, luster, etc., should be "long" enough and must be baked not less than one hour at 250°.

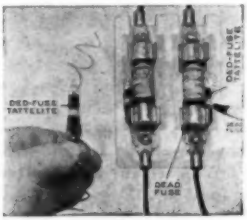
Stradley Joins Binks Mfg. Co.

E. S. Stradley of Detroit, who has had long experience as an industrial and installation engineer, has become associated with the Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill., as a General Office engineer. Mr. Stradley's efforts will be devoted principally to the promotion, installation and supervision of paint-line circulating systems, not only in automobile plants but in all types of industrial institutions, wherever located. Mr. Stradley's appointment to the Binks staff follows in the wake of a great flow of orders from the large auto plants for entire modernization of their paint finishing lines.

Shows a Blown Fuse

Ded-Fuse Tattelite is the name of a tiny neon lamp and casing, designed to tell instantly when and where a fuse is blown. The lamp bulb itself is only the size of a pencil tip 1-in. long.

Ded-Fuse Tattelites connect directly in parallel with the fuse and draw no current until the fuse has blown; are adapted for use on any size cart-



Saves hunting for a blown fuse.

ridge fuse, and even plug fuses, since they measure only 1¾-in. long over all, have 5/16-in. maximum diameter, and 6-in. connecting leads; are designed for circuits of 100 to 550 volts AC or DC and light on only .0005 ampere current. A protective resistance is built in. Other uses are for indicating open circuits, switches, relays, etc. Product of Littelfuse Laboratories, 4607 Ravenswood ave., Chicago.

Durable Black by Chemical Bath

The Jetal Process, developed by the Alrose Chemical Co., 80 Clifford St., Providence, R. I., is a chemical process of coloring all grades of common iron or steel a brilliant and uniform jet black by simple immersion in an aqueous bath of comparatively low temperature for about five minutes. No plating, spraying or baking is required.

The bath is prepared by dissolving Jetal salts in water at room temperature. Welded steel containers, used for the solution, can be heated by steam, gas or oil; the temperature required is about 270°F.

The work to be colored can be handled on racks, in bulk, in baskets or barrels, depending on its nature. The preliminary cleansing does not have to be as thorough as for plating, but all oil or rust must be removed by ordinary cleansing methods such as alkaline and pickling baths. After rinsing in clear water, the work is immersed in the Jetal bath.

The brilliant Jetal finish of black does not alter the dimensions of the article. The finish is a part of the metal itself and hardens the surface. It cannot chip, scale, peel or discolor. Strips of steel can be given several passes through reducing rolls without affecting the black finish. It can even be stamped and shaped after the finish is applied without impairing the black surface. Since it is firmly adherent to the metal, it forms an excellent bond for any subsequent coating such as lacquer, varnish, enamel, paint or similar finishes.

The Jetal Process can be applied to work having the highest degree of polished surface without dulling the luster.

What's New « «

Buffing Cloths

Improved buffing cloths for buffing wheels are announced by The Udylite Co., 1651 E. Grand Blvd., Detroit, Mich. Every piece of cloth entering into the construction of the Udylite Humidified Buff is treated by a special humidifying process to bring the moisture content up to the proper point for maximum tensile strength.

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According to the company, buffs made from pre-treated cloth are better buffs. They wear longer, cut better, perform better and reduce buffing costs. Cloth having the proper moisture content has greater tensile strength and wear resistance than cloth deficient in moisture. Udylite offers the Humidified Buff in any type, any size, any sewing . . . . made to your specifications.

Gang Mixing Tanks

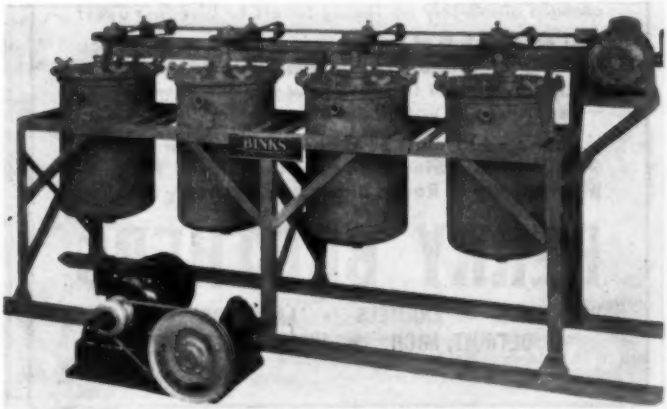
For production work requiring the spraying of certain products in different colors, Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill., offers a series of mixing tanks, each containing a different color, as the working supply of finishing materials. Paint in these tanks is kept in a constant state of agitation by an agitator in each tank. A separate paint-circulating pump is used for each tank. Paint is pumped from a bottom outlet of the tank. After having been projected through the spray nozzles, any material that fails to adhere to the product being finished is reclaimed in a tank and, after having passed through a filter for cleaning, is recirculated back to a top inlet in the mixing tank.

Makes Paint Stick to Galvanized Iron

With the development of "Lithoform" by the American Chemical Paint Co., Ambler, Pa., the problem of making paint stick to galvanized iron and galvanneal has been solved. Surfaces treated with this new chemical will "take" paint perfectly. The coating provided by "Lithoform" will not wash off, nor chip, nor corrode in the weather, and it is not affected by baking temperatures.

"Lithoform" can be brushed or sprayed. By way of preparation the surface is first cleaned and then lightly scoured with fine steel wool. Following the lithorizing treatment, the surface is washed and dried and is ready for painting. Lithorized surfaces will not react with the atmosphere, so they do not have to be painted immediately.

Research found that the reason paint would not adhere to galvan-



Tank capacities, 18.7 gallons each; pump motor, ½-hp.; motor to drive mixers, ¼-hp.

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The Time: *October 21 to 26*

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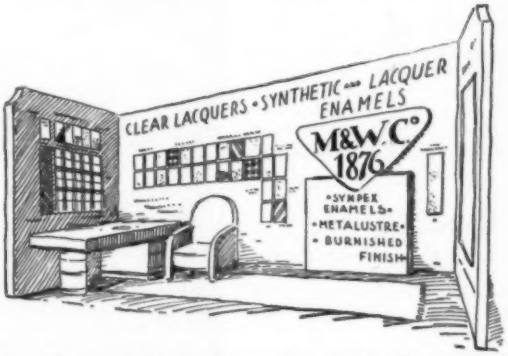

And while you are there, be sure to visit the M & W booth and take a few minutes to consider the money-saving possibilities of our three new finishes:

SYNPEX ENAMELS — Combination Synthetic and Lacquer one-coat enamels, made in five grades for a wide variety of uses.

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BURNISHED FINISH — A finish that, applied on wood or metal, gives the appearance of a hand-tooled and finely burnished metal surface. Of interest to casket manufacturers because it will cover the grain on cypress. Applicable to other low-priced woods and wall-boards, for store fixtures, decorative partitions, panels, etc.

Maas & Waldstein Company

430 RIVERSIDE AVENUE NEWARK, N. J.

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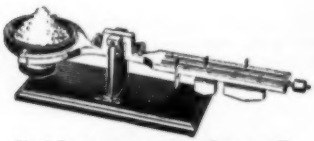
ized iron and galvanneal was because zinc oxides and carbonates formed on the surface by reaction with the atmosphere, combined with the oil in paint to form an insoluble, inelastic zinc soap. It was this inelastic soap layer between the metal and the pigment that cracked and caused the paint to peel. "Lithoform," by purely chemical action, forms an impervious stone-like coating on the metal. This coating prevents the formation of zinc soaps and in addition forms a better bond with the paint.

The material is designed to cover 1000-sq.ft. of surface per gallon. It is available in quart and gallon bottles, and in 5 and 12-gal. carboys.

Balance Scale

A low-priced balance scale of great accuracy is announced by The Chemical Publishing Co., 175 Fifth ave., New York, N. Y. The Bennett Bal-



Useful; accurate; attractive; small.

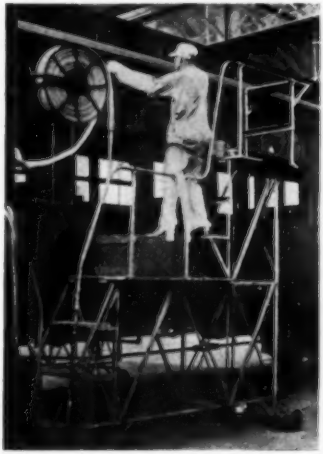
ance weighs up to 100 grams and has a sensitivity of 1/100th of a gram. It is a rugged, compact device, less than 1-lb. in weight and about 12-in. long.

There are no loose weights to be lost. It has an alloy steel knife edge and a highly polished agate bearing which make for great sensitivity and durability. A special beam arrest prevents excessive wear of the knife edge and centers the latter automatically for each weighing.

A 4-page bulletin from the Metallizing Co. of America, Inc., Los Angeles, Calif., contains illustrations and information about spraying real metal coatings, using metal wire as raw material.

Portable Scaffold for Car Painters

TO ENABLE a spray operator to work at different levels, without assistance, while painting elevated cars, A. H. Daus, mechanical department of the Chi-



Small wide-face wheels and substantial construction make this outfit safe from tipping over—an important consideration.

cago Rapid Transit Co., has designed and built a portable outfit which can be easily moved about by one man. It is constructed chiefly of angle iron and pipe iron, and it affords the workman remarkable convenience and safety. Steps and platforms at different levels make it possible for him to work at whatever heights he finds best for painting the work from bottom to top. His spray outfit and accessories are carried right along with the portable scaffold, which is a vast improvement over the old horses, step ladders and planks.—J. W.

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Finishing Pressed Metal Toy Wagons

What is the most economical method of finishing the pressed metal bodies and disc wheels of toy express wagons; production to be 500 to 1000 bodies daily; wheels 4 and 8-in. in diameter? A one-coat, baked enamel job is desirable. How about putting on the enamel by dipping?—W. C. & P. B. Co.

In the finishing of pressed metal bodies and disc wheels for coaster wagons, the general practice in the larger production shops is more or less along the lines of the following system:

Spray the Boxes

The spray booth is equipped with two stands so that while one box is being sprayed on one stand, a finished box is being removed and replaced with an unfinished box on the other stand. In this way the operator sprays continuously; he is not delayed on account of there being no boxes ready. Boxes are placed on the stands and removed by a helper. These boxes are then stacked on portable racks or trucks or a conveyor, and sent to ovens where they are baked for an hour at anywhere from 170° to 200°F.

The reason I recommend spraying instead of dipping for these wagon boxes, is that, because of their peculiar shape, it is almost impossible to obtain a satisfactory drain after dipping.

Spray Disc Wheels

About 10 to 15 wheels are placed on a metal bar, with enough space left so that the spray operator has room to work. Each wheel is spun individually and is sprayed without the operator having to change the position of his gun. This is done very rapidly, with only one pass of the gun. The rack on which the wheel bar is set is so equipped that it can be rotated, and the same spray operation takes place on the opposite side of each wheel.

I do not suggest dipping disc wheels because, while the wheels are being dipped, paint enters through the axle hole, and there is no way for this paint to come out other than through this hole. This results in a large loss of paint, and when the wheel is handled this paint (still not dry) will flow from the hole.

In most cases, wire wheels are dipped for a one-coat finish.

Really, it would be best for a qualified paint engineer to make a thorough study of your particular requirements, giving full consideration to any tests you may employ, and with due consideration for any special or unusual shop conditions.

A toner enamel, reduced with varnish or naphtha, is a good material to use for this kind of finishing. Generally these toner enamels are reduced one part of enamel to five parts of varnish for spraying; for dipping the same reduction is used, excepting that the red is increased to 1¼ parts. These special toner enamels are available in colors other than red

Questions « Answers

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WHY? DOES AMERICA'S BASIC INDUSTRY* SPECIFY BINKS SPRAY EQUIPMENT

A careful study of the advantages of the Thor Model 2 Spray Gun will show you why so many are changing to Binks in so many finishing fields. The precision with which the Thor 2 is tooled, its durability—built for years of wear—its perfect balance—its micrometer adjustments giving accurate control over air and material—all these advantages make Binks the first choice of all who know the importance of FINISH. Send today for Binks new 36-page catalog on Spray Painting Equipment.

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. . . colors generally purchased by toy manufacturers, keeping in mind good wearing colors as well as those having the maximum sales appeal.

Where baking conditions will permit, the toner enamels can be baked at a temperature as high as 240°F. for 45 minutes, with excellent results.

It is essential that the correct type of varnish be used in conjunction with toy enamels; otherwise the best possible results can not be secured, as there must be a perfect blending of the enamel and varnish. — E. W. WINDSOR, Automotive Division, Sherwin-Williams Co.

Lacquer Refinishing

In August issue I notice an inquiry by G. & I. Co. in regard to refinishing with lacquer (see page 53). You probably realize that lacquer must be sprayed on very thin in order to avoid orange peel, therefore more coats are required than with varnish in order to get a good body. If you remove your old finish with liquid remover, you will find plenty of trouble from wax spots, or from the wax not being cleaned thoroughly from mouldings and inside corners.

I have been refinishing furniture several years, and have found that unless it is table tops, I get better and quicker results by using a quick-drying varnish—and I don't have to use so much material. Perhaps if you try using a good sealer before you apply your lacquer you will get better results. Any of the concerns you do business with will be glad to help you with your problem as to what material will be best for your work. But as a rule, in refinishing, you can not always use the same materials on every job with good results.—J. K. COOPER.

Furniture Refinishing

This is from one of the forgotten men in the finishing trade—the repair man. Being employed by one of the largest storage and moving concerns in the country, I have occasion to come up against more problems than the majority of men in this line.

When finished furniture is scratched or marred, or when paper and pad marks are on it, then I have to fix it up to look like new. Most of my work is done in the homes, which means it has to be done with minimum inconvenience to our customers. Working in the usual manner to remove paper marks often leaves the finish soft and tacky, which is the thing I want to avoid. Also, many of the modern finishes won't stand much rubbing. Often a repaired place shows a break in the finishing that has been done by spraying.

Here is an experience I had with a deeply scarred table top: I filled in and "Frenched" or polished the top. When finished, it was accepted as a good job. However, two weeks later the lady called the office and said something was wrong with the top. I went out and found she had a cover the full length of the table but had left about 6-in. exposed on either side. These exposed parts showed rough, as though they had been covered with fine sand. I went over the top again and made it look satisfactory, but

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As a result, Du-Pros is known as the pure shellac that always flows out well, dries dependably, and sands smooth with a few crisp strokes.

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some time later I had to go back and found the same thing. I took rottenstone and water, and rubbed until I took off all the film I had put on. Where I had gone down to the wood in sanding it was all right. I concluded that the top had a highly polished wax surface. It looked like a high gloss, rubbed varnish finish.

What are we to use on furniture that is lacquer finished? I find that in patching and polishing a lacquer finish, it is a much harder and longer job with amber glaze and etheral varnish. Also, I find it will not stand much rubbing unless I let it stand some time before the rubbing process.

I have been using a company's products which I always found to be of the best and satisfactory. However, if the usual lacquer finish requires a patching lacquer, then I would like to get something different than what I have been using.

I will appreciate it very much if you can put me in touch with some individual or concern that can help me . . . what is best to use or do. I find that each job is different from the last . . . each one is a problem by itself.

What about leaving a hard finish.—W. G. D.

To be a good repair man, one must learn each operation that takes place in a factory finishing department, and how different materials should be used. In other words, to do this work successfully a man should be an expert finisher.

Paper pad marks can be removed by using paraffin oil and fine pumice stone on a burlap pad. First rub the marks; then rub the whole surface so you will not leave a spotted effect. This can be done on a hard lacquer surface or on a good gloss-rubbing-varnish surface. But if it is flat varnish you may have some trouble, as most flat varnishes (although not all) soften up under rubbing. If this happens there is nothing left to do but sandpaper the entire top and give it a good coat of half flat varnish and half gloss varnish. This will give a semi-gloss effect and will not require much rubbing, but it rubs very good.

Whenever the oil and pumice rubbing method fails to remove pad marks from a lacquer or varnish surface, I have found alcohol a great help in removing these marks. Dip a large soft rag in alcohol and wring it out as dry as possible, leaving the rag damp. Fold it into a pad, dip your finger tips in paraffin oil or rubbing oil and place on this pad, and then rub the surface rapidly. Repeat this operation until the marks disappear.

The right way to fill in a deep scar in a top or surface follows: If the scar is deep and has removed the stain, you should have different kinds of stain — water, and oil, and spirit, and in all colors—so that you will be able to touch up and match up any color of furniture that comes along. You should have different colors of stick shellac or burn-in cement —walnut, mahogany, transparent, ivory, and white. I always use the transparent. Touch up the scar with stain to match; then run in the transparent cement with a hot burn-in knife, using just enough to fill up the scar evenly. Work the hot knife rapidly over the cement with quick movements to avoid scorching the finish. Be sure to keep your burn-in knife edges smooth by repeat-

convince *yourself!*

We believe there are *many* products in our line, superior to *any* other on the market and would like to prove it to *you* at *our* expense. . . . Let us submit free working samples of a few *exceptional* items.

No. 1000 (licensed) GLOSS LACQUER	(Heavy body—water white)
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You will be amazed at the unusual merits of all these items.

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Yesterday—

"Wood Lacquers"

TODAY—

3697 SUPER WOOD FINISH

A GRAND PIANO is not comparable with a midget radio. Neither is 3697 with "wood lacquers" of the usual type, made to sell at minimum prices. If the best is none too good for your product, remember 3697 only costs a trifle more. This trifle, however, permits us to use ingredients of surpassing qualities.

3697 has optimum resistance to graying, checking, cracking and scaling. It dries rapidly, recoats rapidly, but hangs on grimly to the wood.

At its best, wood is a treacherous surface for finish. We expect 3697 to be used on the best wood, carefully prepared. Try humidity and temperature-change tests on it. Test it for toughness. Notice the enduring brilliance of the finish.

For the most critical—3697.

The
VARNISH PRODUCTS CO.

5208 HARVARD AVENUE, CLEVELAND, OHIO

edly running them over sandpaper. This will prevent the knife from scratching the surface of your finish. Dip a small piece of felt in paraffin oil and, with a little pumice stone, rub the cement down even with the finish.

I notice you say that lacquer will not stand as much rubbing as varnish. On the contrary, lacquer will stand much more rubbing than varnish.

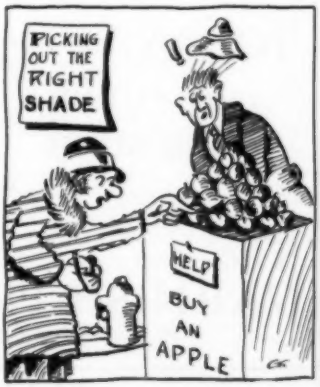
If one is not familiar with all finishes, it's hard to tell flat varnish from flat lacquer. One should be able to tell all finishes by sight to be a successful repair man.

All finishes are not lacquer just because they are called lacquer. Different lacquers are made by different finish manufacturers everywhere. Some lacquers have 14%, 15%, or 16% solid content; others run as high as 21% solids. The difference in the percentage of solids gives different finishes. Some have high luster; some are semi-gloss, and some look dead. This is what makes it so hard to distinguish one finish from another. The higher the percentage of solids, the higher the cost of the lacquer.

Patching lacquer surfaces with lacquer can only be done with a spray gun (that is, satisfactorily), and if I were in the repair shop, I'd have a portable spray outfit. There is always a place in the home that can be used in an emergency for spraying furniture; for example, the basement or back porch. It's almost impossible to brush the new finishes, as practically all furniture finishes are sprayed on. You can not match such a finish successfully unless you spray it.—T. R. NALL.

It is difficult to give you much helpful information because, as you say, every job you have is different. It is seldom that two manufacturers proceed in the same way and use the same materials in finishing. Some start the foundation of a finish with one kind of material and finish with another, whereas others will start and finish with one kind of material only. I know of one firm that starts to coat first with lacquer sealer, and then gives the article two coats of lacquer, followed with two and three coats of synthetic varnish. Then the tops of dressers, night stands, tables, and buffets are rubbed.

In many cases the most economical and satisfactory way to repair damaged finish is to remove all the finish from a top or drawer front or panel and refinish the part completely. It requires the right kind of materials and time to get a satisfactory hard finish. I know of one manufacturer of finishing materials that has spent quite a lot of money trying to get some kind of material that would solve these and similar problems. —E. W. B.



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Nanki Flat—The Ideal Flat Varnish which dries exceedingly hard and may be rubbed or polished. Proof against ordinary alcoholic beverages.

3007 Lacquer—A very pale rubbing and polishing lacquer which is made in several sheens. Proof against ordinary alcoholic beverages.

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2245 VALLEY AVE., INDIANAPOLIS

Letters from Readers of "Industrial Finishing"

The names and addresses of firms or individuals whose letters and inquiries appear in this department may be had by writing this office, or letters addressed to them in care of this office will be forwarded promptly.—The Editor.

Graining Rolls

One of our subscribers in Brazil has written us as follows:

"Could you put me in touch with one or two manufacturers of rolls and other accessories required for the repainting of cash registers in a wood finish?"

If you can give us the name of such manufacturers we would appreciate it.—NATIONAL PAINTERS MAGAZINE.

Bleaching Process

We have developed, in connection with our own operations, a bleaching process that has been found to be commercially practicable for removing not only sap stain discolorations but also the natural color of the heartwood and sapwood of a number of commercially important woods.

Patent applications have been filed covering this new bleaching process, and it is our plan to license concerns in non-competing lines for its use on their products, where it is found to be suitable. . . . —T. H. M. Co.

Swedish Putty . . . Filler

With reference to "Swedish Wood Filler" referred to on page 51 of the September issue, I have in mind a so-called "Swedish putty" which might possibly be related to the Swedish filler mentioned. Without having the exact proportions, this Swedish putty is substantially a mixture of equal parts by weight of whiting and liquid glue, to which is added a considerably smaller proportion of any gum-oil varnish and a still smaller proportion of linseed oil. When thoroughly mixed this produces a plastic mass which holds its consistency quite well in a tight container, but when spread on the work it dries or hardens rapidly and leaves a very tough surface which, when sanded smooth, will take paints, varnish or other appropriate treatment. If it is desired with so-called "tooth," about one-fourth of the amount of whiting can be replaced with a finely powdered silica.

This "putty" is used successfully in filling cracks, wall board joints, and for other similar purposes where a paint or other subsequent covering is to be applied.—W. L. MCFADDEN, The Lawrence-McFadden Co.

Results; Appreciation

We thank you very much for the news item in September INDUSTRIAL FINISHING. It is rather remarkable the response we have gotten . . . we are receiving from five to ten inquiries a day for samples and additional information.—The Neville Co.

Striping; Treating Wood; Silk Screen Work

Will you kindly send us any available information regarding the following:

Where we may obtain a hand striping brush—a small unit with reservoir—for striping small objects with lacquer. (S. J. Co. requested this information in June issue.)

The Grady Mfg. Co's process for hardening soft wood. (June, 1935.)

Your article on silk screen method of reproduction which appeared in

M S A Comfo - Respirator
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Sure protection against microscopically fine dust . . . and a trifle over 5 ounces in weight.

M S A Comfo-Respirators, officially approved by U. S. Bureau of Mines, combine exceptionally low breathing resistance and light weight with easy, snug-fitting adjustment and absolute non-interference with goggles, etc. Men CAN and DO wear them all day long without complaint. Equally important, Comfos provide the best available protection against all industrial dusts, the longest service life per filter and the lowest filter replacement cost. Investigate these proved dust respirators — write for the M S A Comfo-Respirator Bulletin — No. CR-1.

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Storage Tank 10 x 20-in.: Weight 85 lbs. Easy to handle. Will maintain maximum pressure of 50 to 70 lbs.

This is a well built, thoroughly reliable compressor which has been made and sold for over six years. Write today for price and full details.

UNIVERSAL MFG. CO.
324 W. 10th St. Indianapolis, Ind.

the December, 1934, issue of INDUSTRIAL FINISHING. (Requested by J. C. Glass Co. in June, 1935, issue.)

This information will be greatly appreciated.—R. H. N. Co. (Musical Instruments).

Antique Finishes for Furniture

We have been receiving your INDUSTRIAL FINISHING and have found same most interesting. We are in need of assistance and trust you can furnish us with the necessary information.

In the finishing of our fine upholstered pieces, at times we must produce old antique finishes, and whereas we have been able to do so with mahogany, our results on walnut have not been satisfactory. We would like to obtain a mellow old patina in walnut and also old effects in fruitwood where birch or beech is used. —V. E. R. (Fine Furniture).

Rusty-Surface Paint

In the April 1935 issue of INDUSTRIAL FINISHING, on page 50, appears an article under the above title. Would it be possible for you to send us the list of manufacturers who make this material? Also, the names of the two concerns whose paint you have used for this purpose?—G. M. V. Co. (Novelties).

Metal Finishes Wanted

I read about the "Rusty Surface Paint" in your April journal, and as my firm is interested in same, I shall thank you to put me in communication with the manufacturers.

I shall also feel thankful if you will give me the names of the manufacturers of good bronze powders, as I want gold powder for renovating picture frames — something that would give an appearance of real gold and will not tarnish for a long time. I also want silver powder for spraying motor cars—a finish that would give a real tint of silver, as I have tried several powders but they show more of an aluminum color than silver.

I am enclosing a letter for J. E. Greene whose article about a material for ornamental iron work appeared in July issue of your journal, and shall thank you to forward same to the gentleman, as he has not given his address in the journal.—Sa. C. Dinshaw, Vienna, AUSTRIA.

Morroco Finish

In the "Letters from Readers" in September issue, page 7, we note a letter from a firm inquiring for the name of the manufacturer of "Morroco" finish, and are very much interested in your reply: "It's Berry Bros." . . . Inasmuch as the word "Morroco" is our trademark, we request that you correct this in your next issue.—The Kay & Ess Co., Dayton, Ohio.

Rubbing-Cleaning Compound

Can you give us names of firms manufacturing a good rubbing or cleaning compound for use in automobile refinishing?—D. F. Co., (Automotive Reconstruction).

Drum Cleaner

In February issue of INDUSTRIAL FINISHING, page 24, you describe a drum cleaner—a device that rolls the drum to be cleaned in either horizontal or semi-vertical position. The writer has scanned several of your issues but does not find an advertisement on this item. We would appreciate it very much if you would give us the name and address of the manufacturer of this machine.—D. Novelty Co.

Super-Stakolite Wanted

We desire to obtain a working sample of a furniture finish known as "Super-Stakolite". This sample is for experimental use in our Research Department, and we will appreciate it if you can give us the name of the manufacturer of this product.—I. G. Co. (Furniture).

Luminous Paint on Lead Castings

We are interested in applying a luminous paint to lead castings and we would appreciate your inquiring through the columns of your magazine as to just how this can be done economically, so that we will get a finish that will not break down. It seems that there is some chemical reaction between the lead and most luminous paints (that we have been able to procure), which causes the

Manufacturers of:

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Make your Finish Sell your goods!

● Walker's Metallic Pyroxylin Enamels. For new and different effects. Has unusual "Eye Appeal."

● Produces a beautiful lustrous finish with excellent adhesion and good coverage in one coat. Can be polished or buffed to obtain a higher lustre.

● Furnished in: Gun Metal, Gold, Silver, Bronze, Copper and various pastel shades.

● Has wide use and varied application. Is now being used effectively over a wrinkle finish to enhance its decorative appearance.

Chart showing full line of colors or a finished sample will be sent on request.

H. V. Walker Co.
ELIZABETH, N. J.

The Emblem of Standard Quality in Finishes.

1905 Strand 1935

FILLER RUBBING MACHINES
DO A REAL JOB

Save Filler

Easy on the operator

Many Plants using them

Write us!

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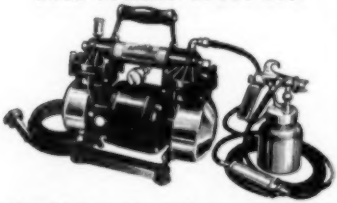
CROWN
AIRFLO
Portable Spray Painting Unit
OPERATES WITHOUT OIL
CUTS UPKEEP COSTS 50%



Ideal for the small manufacturer. No Crankcase—no oil-laden air. Operates with oil-less bearings guaranteed 25 years. Delivers more pressure—more volume per motor horsepower. Fewest moving parts. G-E motor, blower-cooled. Extremely portable. ¼,1/3 and ½ H.P. Priced from $74.50. Write for full details.

CROWN SPRAY GUN MFG. CO.
1218 Venice Blvd. Los Angeles, Calif.
Warehouses in Principal Cities

paint to blacken and crumble after a few months. We have tried several base coats, but they do not seem to be successful in eliminating this trouble.

Due to the large surface to be covered, we are unable to apply the real radio-active paint which is very high in price. We should like to obtain a source of supply of non-radio-active paint that would give us a fair degree of luminosity, and also one that would stand up well. We would appreciate any information you could pass along on this matter. —K. D. Co. (Religious Goods).

Wood Graining on Metal

We would appreciate receiving promptly all information you can give us concerning up-to-date methods of wood graining (mahogany) on lacquer-finished metal surfaces. The problem we have in mind is the application of wood graining over the lacquer ground work of metal caskets; after graining is done, a coat of clear lacquer will be applied over all. Any hints you can give us concerning such graining work will be highly appreciated. . . . We need this information quickly. . . . —K. C. K. Co. (Auto Bodies).

Heat-Resisting Enamel

In the August issue of INDUSTRIAL FINISHING, page 4, the M. S. T. Co., (Electrical and Steam Cookers) asks about heat-resisting enamels, etc. We, too, are much interested in this question and would appreciate your cooperation to put us in touch with whoever makes them. — J. R. Co. (Specialties).

For Sandblasting

We are in the market for a small sandblast equipment, but do not know the names of various manufacturers of this equipment. Possibly such firms advertise in your publication. We would appreciate a sample copy or, if you have a list of manufacturers along this line, the information will be appreciated.—G. M. S. (Importers, Mfrs., Agents).

Venetian Blinds

Can you advise us from what source we might obtain some general information relative to the manu-

facture of Venetian blinds? Would like to know the manner in which this product is sold, and what type of machinery is used to make it. In fact, we are interested in any general information that might give us an idea as to whether or not this field is already well covered, sources of supply, etc. — B. C. & C. Co. (Boxes, Baskets).

Aluminum Foil

We are eager to find a source of supply of Aluminum Foil, 50-in. wide and .01-in. thick. We have been advised that you would probably be able to put us in touch with suppliers of this material; we will appreciate the names and addresses of any firms who handle this type of material. A matt finish is desirable, if possible. — The Ioco Rubber & Waterproofing Co., Ltd., Netherton Works, Anniesland, Glasgow, W. 3, SCOTLAND.

Crack Filler; Sealer

Could you please advise whom we can contact to procure a crack filler that will take an oil stain? Also, where can we get a fast-drying sealer to be sprayed and used on soft wood. Any information will be very much appreciated.—D. Products Co.

Etching Glass

We are in need of information relative to the deep etching of glass. We are wondering if your magazines have contained any articles on this subject? Or if not, whether you can tell us where it might be obtained? —C. O. Mfg. Co. (Specialties).

Steel Wool Pads

We refer to May issue of INDUSTRIAL FINISHING in which, on page 48, you have an article regarding "Steel Wool Pads." Kindly ask the firm, American Steel Wool Co., to send us all particulars, prices and discounts.—Amerikanska Kummi A-B., Stockholm 3, SWEDEN.

Non-Slip Wax

In one of your recent publications I read an article on a non-slip wax which was being made. Will you kindly give me the name of the

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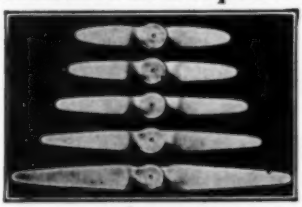

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maker of this, or advise where I can get it in Chicago, and what it is called. — S. T. Co. (Equipment for Furn. Mfrs.).

Striping Devices

We would appreciate your giving us the names of several manufacturers of striping devices for striping croquet balls. . . . We wish to compliment you on the fine publication you are producing, and sincerely trust that it will continue to progress.—M. W. Co. (Specialists in Turning & Finishing Fancy Woods).

Luminous Finish

Can you name a source of supply for luminous lacquers or paints that can be used for dipping or spraying purposes on fish bobbers? We have several inquiries from manufacturers who would like to use this material on their bobbers for night fishing.—N. O. & R. Co. (Paint Distributors).

Lacquer That Stretches

Please inform me who manufactures lacquer that stretches like rubber, as mentioned in August INDUSTRIAL FINISHING, page 48.—F. Q. O.

Novelty Finishes Wanted

In your issue of August 1935, page 53, you have a letter from a concern asking for novelty finishes. We also are in the novelty game and are always looking for something new. Our line is made of wood and is being used as jewelry on ladies' hats and dresses. Any information you can give us in regard to novelty finishes will be greatly appreciated.—B. & C. Co. (Novelties).

Oil-Water Separator

We are contemplating several different methods of cooling our compressed air and getting the water and oil out of same. We would like to know the various advantages and disadvantages of doing this by running the air: 1) through under ground pipes, 2) through a tank of cold water, 3) by a separator consisting of a short length of 6-in. pipe packed with excelsior, 4) a combination of the above methods. Please give us full information on

this subject. We have seven spray booths and one large Gardner pump making 78-cu.ft. per minute.—D. G. Co. (Furniture).

Northern Research Industries

Our finishing foreman would like to know if you can furnish us with the address of the Northern Research industries. They formerly were located at Minneapolis, Minn., but we have been advised that they moved. We have been using their polish by the name of "It". We would appreciate it very much if you could give us any information in regard to this firm.—T. Q. D. Co. (Caskets).

Metal Cleaning

In August issue of INDUSTRIAL FINISHING we note an article on page 36 pertaining to a book on the cleaning of metals. We would consider it a favor if you would send us one or two copies of this book.

Also, on page 38, we notice an article about the cleaning of panels with tack rags before spraying. May we have more detailed information in this matter?—H. M. Co. (Fixtures).

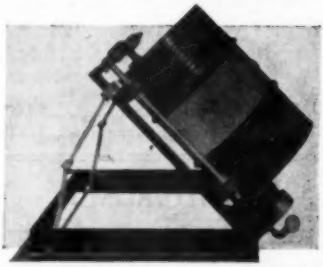
Furniture Finishing

The company with which I am employed is contemplating entering the furniture manufacturing business, and I would like a little information.

At present I am using a water stain on articles I finish, and this is satisfactory, but for furniture I feel that a quick-drying filler-stain would probably be more satisfactory. I would like to find out the composition of a good filler-stain or, if it is not practicable to make up my own, where I can obtain some?

I am using a lacquer finish at the present time and will probably continue doing so, and I should like to have your opinion as to the best material to use in rubbing it down. —C. Y.

Drum Cleaner



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EDITORIAL

New York's Preference in Colors and Furniture

One of our correspondents in New York City reports that colors of the Colonial days are in fashion at present. A leading Fifth Avenue store is exhibiting a series of rooms in these historical colors. One is a deep mulberry, almost an egg plant shade. Others include a beautiful soft powdery blue with a hint of green, a pearl color, a dull brown, a "Palace" green. Wedgwood colors, found in the old Wedgwood pitchers and cameos, are also in vogue. One of these is gray-green; another is a pale blue. Hydrangea blue is popular. White is still going strong in all lines of decorative and design work, from the smallest articles to the largest, including furniture.

A movement to lighten bedroom furniture by the use of woven cane panels on bed ends, dressing tables and caned chairs, is in evidence. One such group is finished in blue-gray enamel.

An unaccountable demand for desk sets is evident; stores are ordering three and four times the usual quantities. Sets in all price classes are selling, but those retailing at $5.00 to $15.00 are in major demand.

Modern Factory Heating

As obsolete pipe coils and floor radiators become troublesome, expensive and inadequate for modern factory requirements, they are being junked in favor of overhead unit heaters, which are much more efficient and satisfactory in every way. Numerous makes of unit heaters are now available, along with complete engineering service to indicate what size and how many should be used and where they should be placed to heat a given area. The movement of air from each heater can be controlled, and arrangements for adding humidity are also possible in most cases.

Due to this movement of heated air, factory rooms can be heated more quickly, more uniformly, and more economically. There is also the matter of floor space, wall space, or ceiling space as compared to pipe coils or radiator or overhead hot air pipes. Unit heaters can be placed where they will

occupy no floor space and where they will not interfere with any other equipment that may require some space along walls, on supporting posts, or in mid air overhead.

What's New in Product Color, Decoration and Finish

Our Washington, D. C. correspondent reports:

Real polka dots that can actually be felt have been perfected with paints and are being used on certain products displayed here. The trick is accomplished by spraying through a perforated sheet in thick mixtures, drying rapidly to prevent runs or sags, and then coating with a clear or slightly amber-tinted varnish or lacquer. The process is used on several articles — cigarette lighters, trays, cases, cigarette holders, compacts and watches.

Small clocks are coming out strongly with flat enameled chromium hands and black dots for numbers. The dots are of contrasting color to the face—sometimes bits of chromium or shiny steel on a black face.

The latest in typewriters—pastel shades with stripes of contrasting pastel, or initials contrasting with the predominant color. Some manufacturers have as many as 18 colors or shades from which any number of combinations can be made.

Several small household articles —bookends, kitchen knife handles, picture frames and chairs—are finished in a new golden enamel that will not chip or wear away rapidly, and which has all the desirable features of "rubber enamels," without having their usual lack of luster.

Metal Finishes Exhibition

This country's first permanent exhibition of metal and plastic products, showing a wide variety of product designs in modern finishes, opened to the public in the new International Building, Rockefeller Center, New York, N. Y., September 16. The exhibition, under the direction of Metal Products Exhibits, Inc., is designed to provide a comprehensive review of metallic and plastic materials as used in all fields of manufacture. One room is occupied by an exhibition of modern metal finishes, which includes numerous examples of straight polishing, electroplating, chemical coloring, rustproofing, lacquering, enameling, and vitreous enameling.

Perhaps the most attractive novelty, to lay visitors, is a group of ordinary tumbler-latch keys finished in various bright colors for easy identification. It might be a good idea for somebody to go a step further and put a luminous finish on keys so they could be identified in the dark.

A display of particular interest is a rust-proofing company's showing of several sets of steel plates with lacquer over Bonderite, which had been exposed to 500 hours of salt water spray, showing remarkable resistance, as compared with lacquered plates not treated with the preparation.

A wide variety of products by well-known designers show highly efficient and beautiful applications of different modern finishes. In fact, the exhibition makes a good showing of modern design, regardless of other factors. It is suggested that when you are in New York, you visit this exhibition for the interest and inspiration there is in it.

Sell Goods to South America

To really attract the interest of prospective buyers of U. S. products in South America, a million dollar floating exposition of the best that the U. S. produces will be shown in 35 important ports of Latin America. An American passenger liner will be entirely refitted with products of participating manufacturers, and the major portion of the exhibits will be articles in actual daily use. Stops in each port will range from two days in the smallest port to 15 days in Rio and Buenos Aires. The trip will consume 10 months.

Through a staff of trained receptionists speaking Spanish, Portuguese and French, each visitor will be given a personally conducted tour through the ship. The visitors' special interests will be noted and each exhibitor and his local dealer or distributor will receive, each day, the names and addresses of those who have shown interest in his products. The expedition has an extensive program for entertaining officials and business men of each community.

Official banquets will be given in each port. Dinners will be tendered to the business men, bankers and professional men of each city.

The project is officially known as "The Latin American Tradeship Expedition" and will represent a cost of about $3,000,000. Invitations to manufacturers to participate will be in the mail about September 15; the expedition will sail on or about December 10, 1935. For further information, write American Tradeship, Inc., Colorado Bldg., Washington, D. C.

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Merwin J. Eberley, Ch. E., who won the Palmer C. Rickets Prize in Chemistry last June at Rensselaer Polytechnic Institute for his papers on Soya Bean Oil, has joined the Technical Staff of the Hilo Varnish Corporation, Brooklyn, N. Y.

J. F. McGarry, well known in Greater New York among the Printing and Lithographing Trades in connection with varnishing and finishing problems, has joined the Sales Force of the Hilo Varnish Corp.

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Metal Cleaning Handbook

Here is a complete book of modern metal cleaning by various modern methods, materials, and equipment, as applied to the different products and metals in the several industries —215 pages size 6x9¼-in., printed on heavy coated white paper, bound in attractive stiff covers and illustrated from original photographs, charts, diagrams and drawings. This briefly sums up Robert W. Mitchell's new Metal Cleaning Handbook, copyrighted 1935 by the Magnus Chemical Co., 49 South Ave., Garwood, N. J. . . . Price $1.00. Contents include wet cleaning with acid solutions, alkali solutions, soap solutions, solvents and electrolytic action; cleaning in tanks, tumbling machines, whirling machines, continuous washing machines; dry cleaning by tumbling; spray cleaning; steam and vapor cleaning; equipment and accessories for production metal cleaning—tanks, agitators, heaters, dipping baskets, pumps, cranes, conveyors; proper materials and methods for cleaning each of the various metals from aluminum to zinc . . . . lubricants for cutting, blanking, forming and drawing sheet metals and wire; maintenance cleaning. . . .

Classified Advertising

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

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By man with vast experience of finishing both on wood and metal. Ten years' experience as foreman finisher on caskets; five years' experience as foreman finisher on furniture. Good on color matching. Address IF-576, care Industrial Finishing.

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INDUSTRIAL SALESMAN WANTED

High-grade manufacturer of full line Industrial paints, varnishes, lacquers and all types of undercoats, located in Michigan, has opening for two high-grade salesmen with ability and experience, to produce volume business. Address IF-577, care Industrial Finishing.

SALESMAN WANTED

Industrial Varnish and Lacquer Manufacturer desires experienced Salesman for Southern Indiana. Excellent opportunity. Prefer man under 40 years old. Give details of experience, age, etc. Information will be confidential. Address IF-581, care Industrial Finishing.

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Desired by Eastern Case Goods Manufacturer. Expert on matching colors, thoroughly experienced with stains, fillers, and lacquers. Must be familiar with latest finishing methods and high speed production. Write in detail as to experience, age and salary desired. Furnish reference and photograph with application. Address IF-578, care Industrial Finishing.

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High-grade manufacturer of full line Industrial paints, varnishes, lacquers and all types of undercoats, located in Michigan, has opening for salesman in Detroit territory who has experience and ability, and who has contacted automobile manufacturers. Address IF-580, Industrial Finishing.

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